REMARKS

The Examiner objected to claims 23, 29-30, 32 and 35 "as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." Applicants gratefully acknowledge the Examiner's indication of allowable subject matter and have so rewritten claims 23, 29, and 30 in independent form.

The Examiner objected to claims 23, 29-30, 32 and 35 "as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." Applicants gratefully acknowledge the Examiner's indication of allowable subject matter and have so rewritten claims 23, 29, and 30 in independent form.

The Examiner rejected claims 27, 28, and 31 under 35 U.S.C. §102(b) as allegedly being anticipated by Reimann (U.S. Patent 4,663,497).

The Examiner rejected claims 21-22, 24, and 36 under 35 U.S.C. §103(a) as allegedly being unpatentable over Lloyd ('523) in view of in view of Reimann ('497).

The Examiner rejected claim 37 under 35 U.S.C. §103(a) as allegedly being anticipated by Curcio et al. (U.S. Patent 6,504,111) in view of Condensed Chemical Dictionary of Hawley's (hereafter CCD).

The Examiner rejected claims 38-39 under 35 U.S.C. §103(a) as allegedly being anticipated by Rosenthal et al. (US Patent 3,105,729) in view of Reimann ('497).

Applicants respectfully traverse the §102 and §103 rejections with the following arguments.

35 U.S.C. §102(b): Claims 27, 28, and 31

The Examiner rejected claims 27, 28 and 31 under 35 U.S.C. §102(b) as allegedly being anticipated by Reimann (US Patent 4,663,497).

Applicants respectfully contend that Reimann does not anticipate claim 27, because Reimann does not teach each and every feature of claim 27.

As a first example of why Reimann does not anticipate claim 27, Reimann does not teach the feature: "a conductive element **consisting of** a lower portion and an upper portion" (emphasis added).

The Examiner alleges that Reimann teaches a conductive element (36, 38 and 40) having a lower portion (36) and an upper portion (4). Therefore the alleged conductive element of Reimann does not consist of the lower portion and the upper portion.

As a second example of why Reimann does not anticipate claim 27, Reimann does not teach the feature: "wherein the conductive material is continuously distributed from the upper portion of the conductive element to the lower portion of the conductive element and throughout the conductive element". Applicants note that the conductive elements 36 and 40 comprise a conductive resist, whereas the conductive element does not comprise the conductive resist. Thus, Reimann does not teach the preceding feature of claim 27.

Based on the preceding arguments, Applicants respectfully maintain that Reimann does not anticipate claim 27, and that claim 27 is in condition for allowance. Since claims 28 and 31 depend from claim 27, Applicants contend that 28 and 31 are likewise in condition for allowance.

35 U.S.C. §103(a): Claims 21-22 24, and 36

The Examiner rejected claims 21-22, 24, and 36 under 35 U.S.C. §103(a) as allegedly being unpatentable over Lloyd ('523) in view of Reimann (U.S. Patent 4,663,497).

Claims 21-22 and 24

Applicants respectfully contend that claim 21 is not unpatentable over Lloyd in view of Reimann, because Lloyd in view of Reimann does not teach or suggest each and every feature of claim 21. For example, Lloyd in view of Reimann does not teach or suggest the feature: "a portion of at least one end of the conductive element extends beyond a surface of the laminate" and "applying a compressive pressure to the portion of the at least one end of the conductive element, wherein the compressive pressure applied to the portion of the at least one end of the conductive element forms a contact pad extending beyond the surface of the laminate".

Applicants respectfully contend that claim 21 are not unpatentable over Lloyd in view of Reimann, because Lloyd in view of Reimann does not teach or suggest each and every feature of claims 21 and 36. For example, Lloyd in view of Reimann does not teach or suggest the features: "pressing a conductive element into the opening such that a portion of at least one end of the conductive element extends beyond a surface of the laminate" and "applying a compressive pressure to the portion of the at least one end of the conductive element, wherein the compressive pressure applied to the portion of the at least one end of the conductive element forms a contact pad extending beyond the surface of the laminate".

The Examiner argues that "Lloyd discloses ... pressing a conductive element (15 and 16,

column 3, lines 9, and 30-32), see figure 4, into the opening (14) such that a portion of at least one end of the conductive element extends beyond a surface of the laminate; applying a compressive pressure to the at least one end of the conductive element (15, 16), see column 3, lines 20-24 whereby the compressive pressure applied to the at least one end of the conductive element (15, 16) forms a contact pad (35, 37, column 3, lines 37-38) extending beyond a surface of the laminate (10), see figure 6".

As a first argument by Applicants, Applicants respectfully contend that the preceding argument by the Examiner is logically inconsistent, because in Lloyd the only conductive element that is pressed into the opening 14 is the conductive element 15 as shown in FIGS. 1-3 of Floyd. After the opening 14 is completely filled with the conductive element 15, the conductive element 16 as added as a conductive powder on top of the conductive element 15 as shown in Lloyd, FIGS. 3-4 and describe in Lloyd, col. 3, lines 30-33. Thus, the combination of conductive elements 15 and 16 cannot represent the conductive element of claim 21 that is pressed into the opening 14. Accordingly, the Examiner's description of the conductive element (15, 16) as being pressed into the opening 14 is logically inconsistent with the Examiner's description of the conductive element (15,16) as subjected to the compressive pressure that allegedly forms the contact pads 35 and 37. Therefore, Applicants respectfully contend that the preceding argument by the Examiner has not established a *prima facie* case of obviousness in relation to claim 21.

As a second argument by Applicants, Applicants interpret the preceding argument by the

Examiner to assert that reference numeral 10 in FIGS. 1-6 of Lloyd represents the laminate of claim 21, so that the portion of the conductive element 15 in Lloyd, FIG. 3 that exists within the upper and lower boundaries of the conductor 11 extends beyond a surface of the alleged laminate 10 as required by claim 21.

In response, Applicants disagree with the Examiner's interpretation of the numeral 10 in FIGS. 1-6 of Lloyd as representing the laminate of claim 21, because Lloyd discloses on col. 2, line 65 that the reference numeral 10 represents a single insulting layer and not a laminate. A laminate is "a laminated product, a plywood". The American Heritage Dictionary 712 (2d ed. 1985), Houghton Mifflin Company, Boston. To laminate is "[t]o make by uniting into several layers". *Id.* Thus, a laminate must comprise at least two layers laminated together, which is not satisfied by the insulating layer 10 of Lloyd since the insulating layer 10 is only a single layer. Therefore, Applicants respectfully maintain that the insulating layer 10 of Lloyd is not a laminate and the Examiner's argument is accordingly not persuasive in relation to claim 21.

Applicants additionally cite the Examiner as admitting on page 5, line 15 of the office action that the insulating layer 10 is not a laminate. In particular, the Examiner specifically states on page 5, line 15 of the office action that "Lloyd discloses the claimed invention, except for the insulator being a laminate".

As a third argument by Applicants in accordance with the preceding admission by the Examiner that Lloyd does not disclose the laminate of claim 21, the Examiner argues: "It is very well known to use laminated as an insulation to allow the insertion of internal layers such as conductive or insulating layers in order to control the coefficient of thermal expansion (CTE) and

dielectric properties.... Reimann shows a laminate (22, 24) disclosed in figure 8.... It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a laminate as taught by Reimann to modify the insulator of Lloyd in order to provide a CTE and dielectric properties for a lamination layer."

In response, Applicants respectfully contend that the Examiner's preceding argument for modifying Lloyd by using the laminate disclosed by Riemann in place of the insulator 10 of Lloyd is not persuasive.

A first reason why the modification of Lloyd by Riemann is not persuasive is that the Examiner has not cited prior art evidence to show that it was known in the prior art to provide a laminate "to provide a CTE and dielectric properties for a lamination layer".

A second reason why the modification of Lloyd by Riemann is not persuasive is that since Lloyd's insulator 10 has a CTE and dielectric properties, it is not obvious to use a laminate instead of the insulator 10 "to provide a CTE and dielectric properties".

A third reason why the modification of Lloyd by Riemann is not persuasive is that substitution of Riemann's laminate (22, 24) for Lloyd's insulator 10 is irrelevant to Lloyd for the following reason. The purpose of Lloyd's invention as disclosed in Lloyd, col. 2, lines 16-19: "The present invention overcomes the problem of unreliable or low quality electrical connections between the through hole conductive plastic material and the printed circuits located on opposite sides of **an insulating layer**." Thus Lloyd's invention is specific to an insulating layer and not to a laminate. Also, Lloyd solves the problem of unreliable connections by teaching "a very reliable low resistance through hole connector to which terminals can be readily fastened with complete assurance of a solid electrical contact between both sides of the board" (see Lloyd, col. 2, lines

42-45). Therefore the addition of Riemann's conductor 24 to the dielectric 22 to form the laminate does not contribute to solving the problem of unreliable connections between printed circuits located on opposite sides of the board.

Based on the preceding arguments, Applicants respectfully maintain that claim 21 is not unpatentable Lloyd in view of Reimann, and that claim 21 is in condition for allowance. Since claims 22 and 24 depend from claim 21, Applicants contend that claims 22 and 24 are likewise in condition for allowance.

Claim 36

Applicants respectfully contend that claim 36 is not unpatentable over Lloyd in view of Reimann, because Lloyd in view of Reimann does not teach or suggest each and every feature of claim 36. For example, Lloyd in view of Reimann does not teach or suggest the feature: ", wherein a width of the formed contact pad in a direction parallel to the surface of the laminate exceeds a width of the conductive element in the direction".

Based on the preceding arguments, Applicants respectfully maintain that claim 36 is not unpatentable Lloyd in view of Reimann, and that claim 36 is in condition for allowance.

35 U.S.C. §103(a): Claim 37

The Examiner rejected claim 37 under 35 U.S.C. §103(a) as allegedly being anticipated by Curcio et al. (U.S. Patent 6,504,111) in view of Condensed Chemical Dictionary of Hawley's (hereafter CCD).

As an initial point, Applicants maintain that the rejection of claim 37 is improper because a claim cannot be anticipated under 35 U.S.C. §103(a) and also because a claim cannot be anticipated by a combination of references.

In addition, Applicants respectfully contend that claim 37 is not unpatentable over Curcio in view of CCD, because Curcio in view of CCD does not teach or suggest each and every feature of claim 37. For example, Curcio in view of CCD does not teach or suggest "a bonding layer between the first and second laminates such that the contact pads of the first and second conductive elements are electrically connected, wherein the bonding layer comprises conductive metal filled epoxy".

The Examiner admits: "Curcio discloses the claimed invention, except for specifying that the thermosetting resin/polymer is epoxy."

The Examiner argues: "Epoxy is one of the best-known thermo sets in the electronic industry used in circuit boards. CCD shows epoxy resin as adhesives for composites and for metals glass, and ceramics disclosed in page 450, column 1.... It would have been obvious to one having ordinary skill in the art at the time the invention was made to have epoxy to provide the thermosetting resin/polymer of Curcio, as taught by CCD, because the epoxy is well known thermosetting material for use in the circuit boards for the purpose of providing a high coefficient of thermal expansion, since it has been held to be within the general skill of a worker in the art to

select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416."

In response, Applicants contend that the preceding argument by the Examiner is not persuasive for at least the following reasons. A first reason that the preceding argument by the Examiner is not persuasive is that the Examiner has made an unsupported allegation of what is "best-known" which Applicants hereby dispute and respectfully request that the Examiner provide adequate evidentiary support as required by MPEP 2144.03C. The Examiner's reference to CCD showing that epoxy resin are known as adhesives for composites and for metals glass, and ceramics does not establish that epoxy is "one of the best-known thermo sets in the electronic industry used in circuit boards".

A second reason that the preceding argument by the Examiner is not persuasive is that the Examiner has not alleged or supported the use of an conductive metal filled epoxy for use as a bonding layer for electrically connecting **contact pads** as is required in claim 37.

A third reason that the preceding argument by the Examiner is not persuasive is that the Examiner has not provided any evidence from the prior art to support the alleged motivation to have an conductive metal filled epoxy for use as a bonding layer for electrically connecting contact pads for the reason of having a high coefficient of thermal expansion. First, the phrase "high coefficient of thermal expansion" is ambiguous since the Examiner has not specified the scope of "high". Second, the Examiner has not shown motivation found in the prior art for having a high coefficient of thermal expansion in a bonding layer for electrically connecting contact pads. Third, the Examiner argues the use of epoxy as an obvious design choice for the purpose of providing a high coefficient of thermal expansion, whereas there is no teaching or

suggestion in Curcio that having a high coefficient of thermal expansion is a purpose of having a conductive adhesive between contact pads.

Additionally, Applicant contends that Curcio cannot be used as prior art in rejecting claims of the present patent application, because "[e]ffective November 29, 1999, subject matter which was prior art under former 35 U.S.C. 103 via 35 U.S.C. 102(e) is now disqualified as prior art against the claimed invention if that subject matter and the claimed invention 'were, at the time the invention was made, owned by the same person or subject to assignment by the same person.'" MPEP 706.02(1)(1). First, the present patent was filed on June 19, 2001 which is after November 29, 1999. Second, the Curcio patent is being considered by the Examiner as prior art under former 35 U.S.C. 103 via 35 U.S.C. 102(e), because the Curcio patent issued on January 7, 2003 which is after the filing date of June 19, 2001 of the present patent application. Third, both the subject matter of Curcio patent and the claimed invention of the present patent application were, at the time the invention was made, owned by International Business Machines Corporation or subject to assignment by International Business Machines Corporation. Accordingly, Applicant respectfully maintains that Curcio cannot be used as a prior art reference.

Based on the preceding arguments, Applicants respectfully maintain that claim 37 is not unpatentable over Curcio in view of CCD, and that claim 37 is in condition for allowance.

35 U.S.C. §103(a): Claims 38-39

The Examiner rejected claims 38-39 under 35 U.S.C. §103(a) as allegedly being anticipated by Rosenthal et al. (US Patent 3,105,729) in view of Reimann ('497).

As an initial point, Applicants maintain that the rejection of claims 38-39 is improper because a claim cannot be anticipated under 35 U.S.C. §103(a) and also because a claim cannot be anticipated by a combination of references.

In addition, Applicants respectfully contend that claim 38 is not unpatentable over Rosenthal in view of Reimann, because Rosenthal in view of Reimann does not teach or suggest each and every feature of claim 38. For example, Rosenthal in view of Reimann does not teach or suggest "impacting the surface of the laminate by the conductive element, wherein said impacting forms a hole in the laminate ".

The Examiner argues that in Rosenberg, the panel 20 is the laminate of claim 38, the sphere 22 is the conductive element of claim 38, and the hole 30 in FIG. 6 is the hole of claim 38 allegedly formed by the sphere 22 upon impacting the surface of the panel 20.

In response, Applicants respectfully contend that the hole 30 is preformed prior to insertion of the sphere 22 therein and is not formed by the sphere 22 upon impacting the surface of the panel 20. The hole 30 is just an embodiment of the of the hole 21 of FIG. 1 and the hole 21 of FIG. 1 is clearly a preformed hole. See Rosenthal, col, 2, lines 34-36 ("Referring to FIGURES 1, 2, and 5, a deformable panel 20 is formed with an aperture 21 for receiving a conductive sphere 22"). The remaining Figures, including FIG. 6, are variants of FIG. 1 in which conductors are disposed in the hole in different geometrical configurations. For FIG. 4, Rosenthal recites in col. 2, line 53: "When the sphere 22 is pushed into the aperture ...". For FIG.

6, Rosenthal recites in col. 2, lines: "The wires are first placed in the hole, then the sphere is pressed into the hole in the position shown". Applicants contend that it is clear from the language in Rosenthal that the hole is preformed in the panel 20 and is not formed by the sphere 22 upon impacting the surface of the panel 20 as alleged by the Examiner.

Based on the preceding arguments, Applicants respectfully maintain that claim 38 is not unpatentable over Rosenthal in view of Reimann, and that claim 38 is in condition for allowance. Since claim 39 depends from claim 38, Applicants contend that claim 39 is likewise in condition for allowance.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account 09-0547.

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